

WHAT IS CLAIMED IS:

1. A cooling unit for use in an electronic apparatus having a computer main body containing a heat generating component and a display unit supported by said computer main body, said cooling unit comprising:

5 a heat receiving portion thermally connected to said heat generating component and accommodated in said computer main body;

10 a heat exchanging portion installed on said display unit;

circulating means for circulating cooling medium between said heat receiving portion and said heat exchanging portion, said circulating means having a pipe line for introducing cooling medium heated by said heat receiving portion to said heat exchanging portion;

15 and  
intermediate cooling means installed in said pipe line, said intermediate cooling means forcing the heated cooling medium flowing from said heat receiving portion to said heat exchanging portion to be cooled.

20 2. A cooling unit according to claim 1, wherein said intermediate cooling means comprises a main body having a path in which the heated cooling medium flows and a fan for supplying cooling air to said main body.

25 3. A cooling unit according to claim 2, wherein said main body comprises a cooling air path in which said cooling air flows and a plurality of heat

radiating fins exposed on said cooling air path, said cooling air path being thermally connected to said path.

5        4. A cooling unit according to claim 2, wherein said circulating means includes a pump for forcing the cooling medium to be circulated between said heat receiving portion and said heat exchanging portion and an accumulator for absorbing a pulsation of the cooling medium discharged from said pump.

10       5. A cooling unit according to claim 4, wherein said pump and said accumulator are incorporated in said main body integrally.

6. An electronic apparatus comprising:  
a housing containing a heat generating component;  
a display unit supported by said housing;  
15       a heat receiving portion accommodated in said housing and thermally connected to said heat generating component;

20       a heat exchanging portion installed on said display unit;  
circulating means for circulating cooling medium between said heat receiving portion and said heat exchanging portion, said circulating means being disposed throughout said housing and said display unit and having a pipe line for introducing cooling medium heated by said heat receiving portion to said heat  
25       exchanging portion; and

intermediate cooling means installed in said pipe

line of said circulating means, said intermediate cooling means forcing the heated cooling medium flowing from said heat receiving portion to said heat exchanging portion to be cooled.

5           7. An electronic apparatus according to claim 6, wherein said display unit contains a display housing incorporating the display panel, said heat exchanging portion has thermally conductive heat radiating plates supported by said display housing, said heat radiating  
10           plates being provided with heat radiating path for introducing the heated cooling medium.

          8. An electronic apparatus according to claim 6, wherein said circulating means includes a pump for forcing said cooling medium to be circulated between  
15           said heat receiving portion and said heat exchanging portion and said intermediate cooling means contains a main body having a path in which the heated cooling medium flows and a fan for supplying cooling air to said main body.

20           9. An electronic apparatus according to claim 8, wherein the pump of said circulating means is driven when the power of said electronic apparatus is turned on and said fan is driven when the temperature of said heat generating component reaches a predetermined value.

25           10. An electronic apparatus according to claim 9, wherein said fan is driven when the temperature of said display unit reaches a predetermined value.

11. An electronic apparatus comprising:

a first housing containing a heat generating component;

5 a second housing, said second housing being journaled detachably on a rear end of said first housing through a hinge device having a hinge shaft extending in the width direction of said first housing and having a rear face which is directed backward of said first housing when said second housing is rotated  
10 to a posture in which it stands up from the rear end of said first housing;

a heat receiving portion accommodated inside said first housing and thermally connected to said heat generating component;

15 a heat exchanging portion installed on said second housing, said heat exchanging portion being capable of being taken out of said rear face; and

circulating means for circulating the cooling medium between said heat receiving portion and said  
20 heat exchanging portion, said circulating means comprising a first pipe line for introducing cooling medium heated by said heat receiving portion to said heat exchanging portion and a second pipe line for introducing cooling medium cooled by heat exchange by  
25 means of said heat exchanging portion to said heat receiving portion, said first and second pipe lines being disposed throughout the inside of said first

housing and the inside of said second housing via  
backward of said hinge shaft, said rear face of said  
second housing having at least an opening portion at a  
position corresponding to said first and second pipe  
5 lines, said opening portion being covered with a  
removable lid.

12. An electronic apparatus according to claim 11,  
wherein at least a portion passing behind the hinge  
shaft, of each of said first and second pipe lines has  
10 flexibility.

13. An electronic apparatus according to claim 11,  
wherein portions extending between said first housing  
and said second housing of said first and second pipe  
lines are disposed apart from each other in the width  
15 direction of the housings.

14. An electronic apparatus according to claim 12,  
wherein said heat exchanging portion contains thermally  
conductive heat radiating plates having a heat  
radiating path for introducing the heated cooling  
20 medium and said second housing contains a mounting hole  
in which said heat radiating plates are to be embedded  
in a rear face thereof, said mounting hole being  
continuous to said opening portions.

15. An electronic apparatus according to claim 14,  
25 wherein a face on an opposite side to said heat  
radiating path, of said heat radiating plate is covered  
with a protective layer having a lower heat

conductivity than the heat radiating plate and said protective layer is exposed out of said second housing through said mounting hole.

5        16. An electronic apparatus according to claim 14, wherein said lid is provided integrally with a cover portion for covering said heat radiating plate, said cover portion being fit in said mounting hole detachably.

10       17. An electronic apparatus according to claim 11, further comprising intermediate cooling means installed halfway of said first pipe line, said intermediate cooling means forcing heated cooling medium flowing from said heat receiving portion to said heat exchanging portion to be cooled.

15       18. An electronic apparatus comprising:  
a housing accommodating a heat generating component and being capable of being opened upward;  
a display unit supported by said housing;  
a heat receiving portion accommodated in said  
20       housing and thermally connected to said heat generating component;

a heat exchanging portion installed on said display unit; and

25       circulating means for circulating cooling medium between said heat receiving portion and said heat exchanging portion, said circulating means comprising a first pipe line for introducing cooling medium heated

by said heat receiving portion to said heat exchanging  
portion and a second pipe line for introducing cooling  
medium cooled by heat exchange by means of said heat  
exchanging portion to said heat receiving portion, said  
5 first and second pipe lines being disposed throughout  
the inside of said housing and the inside of said  
display unit and being divided to upstream portions and  
downstream portions inside said housing, said upstream  
portions and said downstream portions being connected  
10 detachably through a joint, said joint having closing  
means for closing said first and second pipe lines when  
said first and second pipe lines are divided to the  
upstream portions and the downstream portions.

19. An electronic apparatus according to claim 18,  
15 wherein said display unit has a pair of leg portions  
disposed apart from each other in the width direction  
thereof, said leg portions being supported rotatably by  
said housing.

20. An electronic apparatus according to claim 19,  
20 wherein said first and second pipe lines are placed  
through the inside of at least any one of said leg  
portions and thermally insulated from each other inside  
said leg portions.